CASE REPORT

Endodontic Surgical Treatment Apicoectomy in Central Teeth Calcium Hydroxide Extrusion: Case Report

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ABSTRACT

Endodontic surgery is a surgical treatment aimed at excising the apical segment of an infected root canal, eliminating necrotic and inflammatory tissue in the periapical area of the tooth. Apicoectomy aimed to eliminate necrotic and inflammatory apical tissue that could not be remedied with traditional endodontic treatment following the extrusion of calcium root canal debris. A 24-year-old female patient expressed a desire to have dental treatment to enhance her teeth visual appeal. After completing root canal preparation, the root canal was sterilised using calcium hydroxide. During the second appointment, there was visible inflammation of the gums near the tip of the tooth. The problem was addressed by apicoectomy procedure. The 1-week assessment demonstrated favourable soft tissue regeneration. The 1-week postoperative evaluation demonstrated satisfactory healing of the soft tissues. Apical resorption and calcium hydroxide extrusion-induced inflammation in teeth can be effectively treated with apicoectomy. An apicoectomy is a surgical operation that involves removing the infected portion of the tooth root and promoting the healing of the inflammatory and necrotic tissue in the area around the root tip to achieve the best possible healing outcome.

Keywords: Apicoectomy, Endodontic surgery, Calcium hydroxide, Esthetics, Extrusion

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INTRODUCTION

Occasionally, the extrusion of root canal-filling material can result in enduring difficulties. Nair stated that the presence of foreign substances within periapical tissues, both during and after endodontic therapy, can sustain the occurrence of apical periodontitis even after root canal treatment has been performed. Exogenous substances have the potential to penetrate the periapical region, resulting in a radiolucent foreign body response, and may persist without causing any symptoms for a prolonged period. Foreign materials include amalgam, endodontic sealants, and calcium salts obtained from Ca(OH)2 that have been extruded periapical (1).

The primary objective of endodontic treatment is to prevent or resolve apical periodontitis by implementing strict aseptic measures or decontaminating the root canal system. This is conducted to establish an environment that facilitates the healing of the tissues surrounding the root. If non-surgical root canal treatment is not feasible or if the disease or symptoms persist despite root canal treatment, endodontic surgery may be necessary to preserve the tooth (2).

Endodontic surgery is a surgical treatment performed to eliminate the infected part of a root canal, specifically targeting necrotic and inflammatory tissue in the periapical area of the tooth. The objective of endodontic surgery, specifically an apicoectomy in this instance, was to eliminate necrotic and inflammatory apical tissue that could not be remedied with traditional endodontic treatment following the extrusion of calcium root canal debris (2).

Teeth that have not fully developed roots or have seen erosion at the root tip are more likely to have medication pushed out into the surrounding tissues, especially when using high-pressure delivery methods. This case report examines the surgical treatment of periapically extruded non-setting calcium hydroxide (3).

CASE REPORT

A female patient reported experiencing pain in the upper left anterior tooth following root canal therapy. The patient experienced dental pain, particularly

when exerting pressure on the tooth while eating. An objective examination revealed that tooth 11 was excessively filled, with secondary caries at the edge of the filling. Additionally, a distinct pink border was observed at the gingival. (Fig 1A). The thermal test findings using chloroethyl were inconclusive, as they showed no significant effects. The treatment plan for tooth 11 is root canal treatment. In tooth 1, after root canal preparation was carried out, it was continued with medication using calcium hydroxide. After application of calcium hydrocycline, the patient complained of continuous pain. However, the percussion test yielded positive results, indicating the presence of a reaction. On the other hand, the palpation test did not reveal any abnormalities. Periapical radiography examination and CBCT revealed extensive radiolucency in the apical region and an abundance of calcium hydroxide in the same area (Fig 1 B,C,D,E). During this phase, irrigation, activation, and hermetic root canal filling were carried out (Fig. 1 F). One months after obturarion the atient still have complaint.

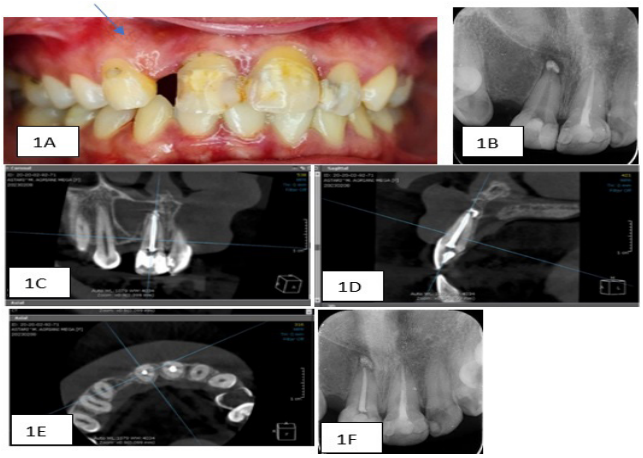

Fig. 1: (A) distinct pink border, (B- E) CBCT revealed extensive radiolucenc y in the apical regi on a nd an a bu nda nce o f calcium hydroxide in the same area (F) Control one months after obturation.

Before the surgical procedure, the patient must complete an informed consent form. The surgical process commenced with applying an antiseptic solution, precisely 10% betadine, both inside and outside the mouth. This was followed by the provision of local anaesthesia by infiltration at the apex of tooth 11, which was the target of the operation. A submarginal rectangular flap incision will be made on tooth 11. Raise the flap entirely by employing a periosteal elevator. The assistant and operator should delicately withdraw the raised flap using the retractor. A surgical procedure involves using specialised equipment and a circular bone bur to perform an osteotomy at the apex of tooth 11. Excise periapical granulation tissue and eliminate calcium hydroxide utilising a curette (Fig. 2). Trim the apex of the tooth by making a 3 mm incision perpendicular to the tooth's long axis. Grade 1 apex preparation was performed with an ultrasonic tip, reaching a depth of 3 mm. The area was then cleansed with saline solution and dried. Then, it was filled with Mineral Trioxide Aggregate (MTA). Haemorrhage is halted by using a cotton pellet saturated with adrenaline. Position the bone graft into the area where the bone is absent and then overlay it with the pericardial membrane. Utilise the interrupted suture technique to close and readjust the flap. Apply a periodontal pack to the wound area, extending 2 mm below the mucosa to the cervical 1/3 of the tooth. After surgery, avoiding hot or warm foods, beverages, and spicy foods is essential. It is crucial to maintain oral hygiene by keeping the teeth and mouth clean. Avoid touching the surgical area with the tongue or hands, and refrain from using it for chewing. Gargling vigorously should be avoided. Medication should be taken as instructed, and alcoholic beverages and smoking should be avoided. It is recommended to keep the periodontal pack in place and schedule a follow-up appointment for evaluation one week after the surgery. The medications administered include antibiotics, analgesics, and oral antiseptic solutions.

Fig. 2 : Periapical removal of granulation tissue and calcium hydroxide using curette

One week postoperative, the patient had monitoring and assessment. The percussion, palpation, and mobility assessment yielded no positive findings. After placing an artificial thread, a sterile saline solution was used to cleanse the surgical area. Subsequently, a radiological examination was conducted to assess the treatment, as shown in Fig. 3. After doing clinical and radiographic evaluations during the 1-week postoperative control, it may be concluded that the treatment was successful. The patient was advised to undergo frequent biannual follow-up appointments to assess the efficacy of the long-term treatment.

Fig. 3: Control 1 week after surgery

DISCUSSION

The extensive migration of Ca(OH)2 into the periapical tissues does not appear to hinder the ultimate healing of the periapical area. However, in most instances, it appears to cause a delay in the healing process. Furthermore, there are accounts of instantaneous

exacerbations triggered by extrusion of calcium hydroxide. Ca(OH)2 extrusion make complications that occurred in this case may have been caused by the binding of CaOH2 administration to the root canal deep enough to create a pressure higher than arterial blood pressure, the CaOH2 paste particles being small enough to seep into the capillaries and then block the capillaries mechanically or induce crystals. cation in the blood, blocking circulation. There have been reports of cases where pre-existing periapical lesions were healed entirely even after 3 or 4 years despite inadequate resorption of the extrusion paste containing BaSO4, which is employed to enhance radiopacity (3, 4).

Over time, numerous authors have supported periradicular curettage as the ultimate treatment for endodontic diseases without needing root tip removal and retro closure. This procedure is primarily encouraged to maintain the length of the root to provide stability. Nevertheless, there is a lack of research examining the impact of root tip resection on tooth stability, particularly in cases where only a 3 mm segment is removed. By removing around 3 mm from the root apex, the operator can eliminate 98% of the apical ramifications and 93% of the lateral canals. Amputating the root tip by less than 3 mm is likely to leave some lateral canals and apical ramifications intact, which increases the likelihood of re-infection and eventual failure (5).

Mineral Trioxide Aggregate (MTA) is a powder that consists of finely ground trioxides (tricalcium oxide, silicate oxide, bismuth oxide) and other hydrophilic particles (tricalcium silicate, tricalcium aluminate) that determine the aggregate's chemical and physical characteristics. These particles combine with moisture to form MTA. MTA exhibits biocompatibility, antimicrobial characteristics, precise adaptability and sealing abilities, and hydrophilic features (2, 4).

To close the bone defect, bone graft can be applied. Bone graft has a good effect on the surgical area, because apart from speeding up healing, bone graft is also able to induce host cells to repair or regenerate bone that has been lost. The process of bone formation or osteogenesis involves osteoblast cells or progenitor cells present in the graft material and osteoinduction, namely the ability of the bonegraft material to stimulate the formation of a scaffold for host stem cells to grow (1, 3). In the osteoinduction process there are many growth factors that influence the change of host stem cells into osteoblasts. The bone healing process using a bone graft usually occurs after 19-20 weeks, therefore a membrane barrier needs to be given (2, 4).

CONCLUSION

During endodontic treatment, the operator must prevent iatrogenic mishaps. This case report presents a novel approach for treating the unintentional extrusion of intracanal medicines into the surrounding periapical area. This approach offers notable benefits, including decreased patient discomfort, improved periapical healing, and eliminating the necessity for surgical intervention.

In recent decades, microsurgical endodontics has significantly improved surgical root canal treatment outcomes. Various devices and techniques have been developed to effectively enhance the operator's ability to treat the excised root apex. Diagnostic devices like CBCT alter preoperative examinations, while temporary amplification of ultrasonic retro tips has streamlined clinical procedures, and biocompatible retro-filling materials have enhanced healing rates in periapical surgery.

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